

Ten years ago Air Force civil engineers responded to the crisis in Southwest Asia as Iraq invaded and occupied Kuwait. Prime BEEF teams and RED HORSE squadrons provided crucial support to Operations DESERT SHIELD/DESERT STORM and made lasting contributions to stability and peace in the region, as reviewed in this

Gulf War Retrospective

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Operation DESERT SHIELD

Air Force civil engineers were one of the most important combat support elements deployed to the Middle East during Operation DESERT SHIELD. They played a critical role in preparing and sustaining the network of air bases that supported the application of air power. Thanks to Air Force civil engineers, Lt Gen Charles A. Horner, commander of U.S. Central Command Air Forces (USCENTAF), could plan and direct the air campaign from multiple bases with confidence and flexibility.

Prime BEEF and RED HORSE troops performed beddown operations for 55,000 people and more than 1,500 aircraft at 25 sites throughout Southwest Asia (SWA). Overall, within seven months nearly 100 projects valued at \$78 million were completed at U.S. deployment locations in SWA through troop or contract labor.

The pace of the deployment was fast. To meet the primary goal of deterring Iraqi aggression against Saudi Arabia, aircraft and crews deployed to the region first, and the support tail had to catch up. Engineers began deploying on August 7, 1990, some with little notice. Once on the ground, they scrambled to bring facilities on line as quickly as possible.

Their first tasks were to prepare runways, runway lighting and arresting barriers; establish fire protection and utilities; plan where facilities would be sited; and provide latrines. Next on the agenda was erecting living and working facilities, preparing ammunition storage areas, and erecting aircraft revetments, followed by environmental and sanitation concerns, facility hardening, and road construction.

Harvest Falcon equipment flowed in from prepositioning sites in the region. Engineers established additional supply lines through contracting officers dedicated to each base. Obtaining heavy construction equipment was a priority. Transportation was scarce during the deployment's first weeks, and much of the equipment that arrived from prepositioning sites was inoperable or soon broke down because seals and belts had dry-rotted in storage. The solution was to borrow or rent equipment from host nation engineers and heavy construction companies to grade areas for tent cities and carve out roads between living and working areas.

DESERT SHIELD saw the first real-world use of Harvest Falcon assets, mobility basing sets developed in the 1980s that gave the Air Force the capability to deploy to bases and establish flying operations within 72 hours. This ambitious mobility concept presented unique problems and challenges to engineers, planners and developers. They developed a comprehensive *Bare Base Conceptual Planning Guide* to help formalize the new system and address how it would be employed.

Most engineers had never trained on the equipment because Harvest Falcon was a new program and training assets were not yet available. When TEMPER tents (Tent, Extendable, Modular, PERsonnel) and utility systems began appearing, many without Technical Orders, engineers were uncertain what constituted a complete set, how they were to be assembled, or how to repair the equipment. With ingenuity and flexibility, engineers quickly laid out the pieces, determined what went where, and began putting up tents. The first tent took about four hours to construct. Shortly thereafter, an experienced crew of four could assemble a four-section, 20x32-foot tent for 12 people in about an hour.

Harvest Falcon also used Harvest Bare structures such as Expandable Personnel Shelters with accordion-like walls that could be used as billets, office space, exchanges or storage areas. Expandable Shelter/Containers were erected as flightline shops, industrial shops and power plant control rooms. General Purpose shelters were hardwall structures designed to be aircraft engine shops and aircraft readiness spares storage areas, and also

served as gymnasiums, clubs, warehouses and exchanges. One of the most interesting looking structures was the 125-foot Harvest Bare Aircraft Maintenance Hangar, known as a clamshell hangar due to its unique fabric-end closures. Members of the 4449th Mobility Support Squadron from Holloman Air Force Base, N.M., accompanied the hangars to help erect them.

The harsh environment made it nearly impossible to do heavy work during the day. Nighttime work shifts permitted troops to be as productive as possible while avoiding the midday heat, which often reached 120° F.

Electricity was critical to Air Force operations. A few sites had adequate commercial power, but generators were required at most. Initially, small 60 or 100kW low voltage mobile electric power (MEP) emergency generators were used to power tent cities, aircraft maintenance shops and logistical areas. They were prone to failure from continuous use in the harsh environment and their roar was almost deafening to tent occupants. The solution was to install more efficient high-voltage MEP-12, 750kW generators and cables that allowed power plants to be placed greater distances from personnel cantonment areas.

Power delivery to end users required industrial-grade distribution equipment. The Air Force was in the midst of a transition from the contactor control cubicle (CCC) to the primary distribution center (PDC). Only three PDCs and no CCCs were available in SWA. In a matter of days, CEMIRT (Civil Engineering Maintenance, Inspection, and Repair Team) technicians designed a simple and reliable PDC using off-the-shelf components. They constructed 35 of them at Kelly AFB, Texas, and shipped them to waiting sites. CEMIRT also established a depot-level repair function in theater and provided hands-on electrical training for Prime BEEF troops.

Another critical issue was water — how to obtain it, purify it, distribute it and dispose of it. Water was trucked in and stored in rubber bladders. It was then chemically treated or processed through reverse osmosis water purification units (ROWPUs). Wastewater was distributed to underground storage tanks and pumped out by contractors or piped to a gray water pond. Where soil percolation conditions, together with stifling humidity levels, did not permit absorption, engineers constructed lagoon systems farther from cantonment areas to reduce health hazards. Entomology experts worked to minimize the spread of disease and reduce annoying insects and rodents.

Requirements at each base varied, but the work accomplished by the Prime BEEF team at King Fahd International Airport, Saudi Arabia, in the first month of the deployment was typical. The team laid more than 4,000 tons of asphalt for roads, parking, helicopter pads, dining halls and the air transportable hospital. They erected more than 370 tents; set up shower/shave units, latrines, potable water and electric distribution systems, and a camp revetment system; designed and installed a bunker system; provided wood floors for administrative and shop tents; and constructed a mall complex. They sectioned the base for bomb damage repair purposes and set up their own logistics operation to acquire scarce materials and tools.

At Riyadh, the Saudi government offered the use of Eskan Village, a housing compound originally built for the region's Bedouins (who preferred not to live there). Air Force engineers and contractors prepared the buildings for occupancy by cleaning up the complex, installing air conditioning and repairing broken pipes.

Firefighters provided crash-fire rescue and structural fire protection services to all Air Force sites in the region. They often integrated with host nation firefighters, sharing equipment and working areas. In-flight and ground emergencies kept them constantly busy, while the high number of patrol and training sorties generated thousands of hot refueling standbys.

In November, President Bush ordered additional forces (Phase II) to the Persian Gulf region to provide an offensive capability. This meant another push to bed down deploying forces. This time, however, engineers were already in place and prepared before aircraft and troops arrived. The presence of 823rd and 820th RED HORSE Squadron personnel in theater provided additional capability to undertake the major beddown tasks.

From October to March, a combined 435-person RED HORSE squadron was involved in more than 25 major projects, valued at more than \$14.6 million. These included bedding down the largest air base in theater (in terms of number of aircraft) at Al Kharj Air Base, Saudi Arabia. They constructed aircraft hardstands and taxiways at Shaikh Isa AB, Bahrain; a theater munitions storage depot at Al Kharj; aircraft parking ramps at Al Minhad and Al Dhafra ABs, UAE; and integrated combat turn pads at King Khalid Military City. They also built an 800-person tent city, erected 29 K-span structures, placed more than 7 miles of paved roads at a U.S. Army ammunition supply point, and installed berms for Patriot anti-missile batteries and petroleum dikes.

Al Kharj, one of the sites selected to receive Phase II aircraft, was a classic bare base location. It had been programmed as a massive Saudi military installation, but only basic pavements had been constructed. RED

HORSE, augmented by the 4th CES from Seymour Johnson AFB, N.C., and contract personnel, hauled 200,000 cubic yards of clay to build a foot-thick clay foundation for tent city. Eventually, they erected a tent city, set up four kitchens, an air transportable hospital, six K-span structures, and support facilities. They built munitions storage areas and bladder berms, completed utility distribution systems, and installed mobile aircraft arresting systems. The base was ready for aircraft in early January and by the beginning of the war was home to nearly 5,000 Air Force personnel.

Another RED HORSE team built a forward operating location 50 miles from the Iraqi border at King Khalid Military City. Contract employees were prohibited from this site because of security concerns. Initially planned as an 800-person site with limited turn capability for flying missions, the base continued to expand until its population reached nearly 2,000 in February 1991.

In December 1990, CE forces from Europe began deploying to bases in Turkey as the coalition opened a second front to monitor and contain Iraq. Engineers planned and executed buildup of three bases for Joint Task Force PROVEN FORCE. At Incirlik they constructed “Tornado Town” and helped bed down deployed personnel. A 50-person Prime BEEF team from Bitburg AB, Germany, also deployed to Batman AB, Turkey, to support search and rescue operations.

Aside from the Middle East, civil engineers deployed to Spain, England, Germany, France, Italy, Greece, Diego Garcia, and to other bases in the United States. They constructed tent cities at transit bases, supported Strategic Air Command tanker and bomber forces at multiple sites, and helped open contingency hospitals and aeromedical staging facilities across Europe.

Operation DESERT STORM

Civil engineers at HQ USCENTAF said they could tell the air war had begun because the phones stopped ringing. At sites in the Middle East, CE was ready — forces were bedded down, equipment and materiel were dispersed, and personnel and structural protection were complete. Many went out to watch the aircraft launch on their first missions. Firefighters started working full-throttle. Integrated combat turns with hot pit refueling operations required continuous fire protection. As combat sorties increased, so did in-flight and ground emergencies, barrier engagements and explosive ordnance disposal response to malfunctioning ordnance.

In the busy days before the formal cease fire was signed, Prime BEEF moved into Kuwait to assist in restoring Kuwaiti facilities. Some went to Kuwait City International Airport to help restart the power plant.

In February, General Horner tasked RED HORSE to deny two air bases in southeastern Iraq to prevent future use by returning Iraqi forces, and the work had to be completed before the signing of a cease fire agreement. Working with EOD personnel, two teams completed the job within four days. At Tallil AB, RED HORSE used approximately 40 tons of explosives to make cuts in the runway and taxiway every 2,000 feet. At Jalibah AB, engineers denied a concrete runway and two asphalt taxiways with 72 craters up to 40 feet wide and 12 feet deep.

Operation PROVIDE COMFORT

Shortly after the war ended, Kurdish refugees began fleeing into Turkey to escape the Iraqi military. Because of their outstanding support to the U.S. Army in Turkey during Operation PROVEN FORCE, Air Force civil engineers were tasked to provide base support to the multiservice, multinational forces under the direction of Combined Task Force PROVIDE COMFORT. They established and maintained base camps at five locations in Turkey and Iraq from which the other services and allies could operate, including the major Humanitarian Service Support Base at Silopi that served as the center of activities for the region.

Engineers had just dismantled Tornado Town at Incirlik when they received orders to rebuild it to support the influx of allied personnel. The Prime BEEF team from Bitburg was recalled to Turkey after being home only a few weeks. They were joined by engineers from several other USAFE bases.

At Sirsenk airfield, engineers and EOD personnel cleared a dumping ground for unspent munitions from coalition aircraft and repaired the runway for C-130 aircraft to deliver supplies.

Redeployment

Redeployment of people and equipment and reconstitution of Harvest Falcon assets was a big job. CE was responsible for dismantling and repacking tents and related equipment.

As some troops redeployed, additional personnel continued to arrive in March and April. Reserve and Air National Guard Prime BEEF teams deployed to Al Kharj and King Fahd, respectively, to help close down the sites.

In summary, civil engineers played a crucial role in Operations DESERT SHIELD and DESERT STORM by providing the basing and support that gave pilots and aircrews the best chance for success. They set the stage in record time and demonstrated once again that air base availability and performance are critical factors in a commander's ability to employ aerospace power. During Operation PROVIDE COMFORT, they tried their hand at humanitarian relief and clearly showed that engineers have a useful role to play in this type of civic action. Ten years later, the scope of their contributions and the excellence of their performance are still impressive.

Sidebar

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